THE GYROSCOPIC INERTIAL THRUSTER

by David E. Cowlishaw

What is *inertial* propulsion? It is the propulsion achieved by a device that does not react with its environment in a mass exchange to produce thrust. That is, the device doesn't use a jet of matter to push it forward, and doesn't grab a hold of something to pull it forward (like a propeller for a plane or boat, or tyres on a pavement). In general, an inertial propulsion device can be described as any thrust-producing device that can be completely enclosed so that no direct matter interactions are possible, and can be placed free-floating in space so that no vibrations propel it—yet still it goes!

The 'traditional' science understanding of inertial propulsion is that it is impossible. Many have tried to accomplish it, but have had little success. However, some have had patents issued on devices that produce a "unidirectional force", but no such device is flying us to the stars as yet!

The traditionalist will tell you that inertial propulsion is pure fantasy, and that Sir Isaac Newton settled the question long ago: that in order to get something to move or change direction, it *must* be acted upon by an outside force; therefore, no matter interactions, no thrust. To shortsighted science authorities, I say *hogwash*!

Figure 1 shows one form of my working inertial propulsion device, one that uses gearing to accomplish the needed spin translations. Why spin translations?

The traditionalist will tell you that "for every action, there is an equal but opposite reaction". For linear reactions (e.g., simple collisions of the billiard ball type), that is true. However, *equal* is not always *opposite* when working with rotary systems and angular energy transfers.

In a nutshell, the Gyroscopic Inertial Thruster (GIT) works by momentarily unloading some of the reverse forces on the centre of mass of the system into the centres of mass of the orbitals, storing that energy long enough to be released in the proper direction.

Other devices either don't work, or work so poorly that they will likely never leave the ground, and that's because, before the GIT, all devices were mostly linear translations that operated around only *one* mass centre: the system and attachments you are using to try to generate thrust.

[You can find a very good collection of previous attempts at this at Roger Cook's Spacedrives Archives (see hyperlink on my web page), where he has one of the most complete collections of online patent covers for nearly every device that claims unidirectional, mechanical, electrostatic, electromagnetic, etc. force, and is a good resource for anyone doing research in this area.]

Previous mechanical devices to date have all used what I call "dumb weight" orbitals. Most of them have mounted weights on arms that whirl around. They are either the variable radius type (where the weights move toward and away from the axle in their orbit, trying to achieve an unbalanced centrifugal force), or the variable orbit velocity type (where each arm speeds up and slows down in its journey around the axle, again attempting to generate an unbalanced centrifugal force but to little effect. To date, none of them has used the spin of the orbitals to share the reverse forces and thus give a net, unbalanced centrifugal force for propulsion.

What most folks fail to take into account is the force needed to extend and retract the weights on the whirling arms in the variable radius type of device (with attendant Coriolis forces), or the force needed to accelerate and decelerate the weights in the variable velocity type of system; as well as that when the forces are summed, a net *zero* thrust is the result. The device whirls; it shimmies, it rattles and shakes; but, put into a frictionless environment, it just makes vibrations without going anywhere!

Of the two, the variable radius type of device may actually show some thrust, since the closer the weights are to the axle, the greater its spin (so storing some reverse force). Thus the principle that allows my device to work may actually vindicate many variable radius thrusters. They are not nearly as powerful as my device, though!

THE THRUSTER SET-UP

The GIT is a variable velocity type of thruster, in that the orbitals speed up and slow down about their orbit, giving us a split-force system. The high-speed side of the orbit gives a greater "centrifugal force" at that end, while the energy needed to speed up and slow down the orbital weights generates what is referred to as "circumferential forces"—two half-circle thrust profiles that will balance or counteract the hoped-for gains of the unbalanced centrifugal force.

Figure 2 illustrates what I'm talking about. Note that the orbitals are grouped at the bottom (the low-velocity side, in this instance), and the lone orbital at the top is the one going flat out (in a circle, of course) at our high-velocity end. The orbit can be turning either direction—it doesn't matter which, once the orbitals are up to a constant average speed.

Figure 3A shows the contact path (top path superimposed on bottom path line) that forces the orbitals to convert their forward race (i.e., groove) velocity into spin, the very heart of this concept. The two half-circle arrow trains represent the acceleration and deceleration forces that the

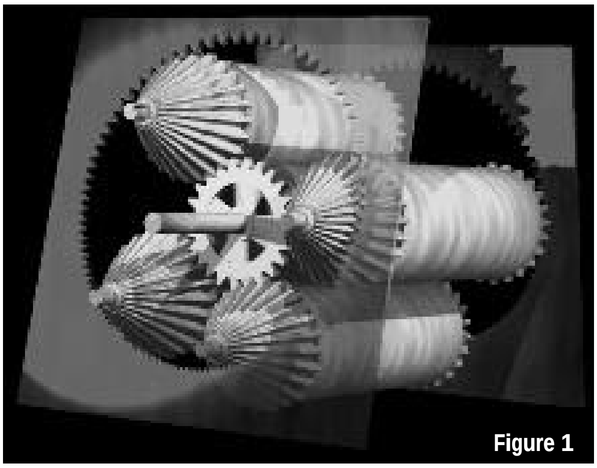

Figure 1

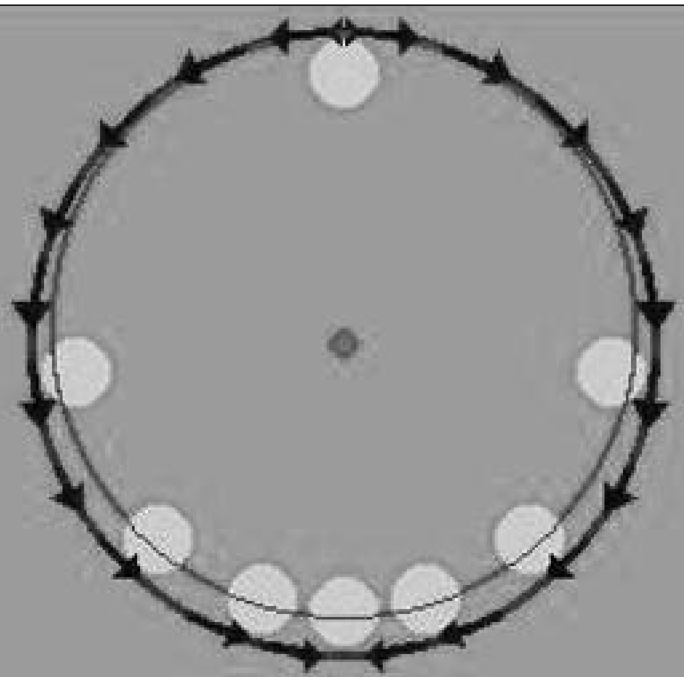

Figure 3A Acceleration, Deceleration Profile GIT

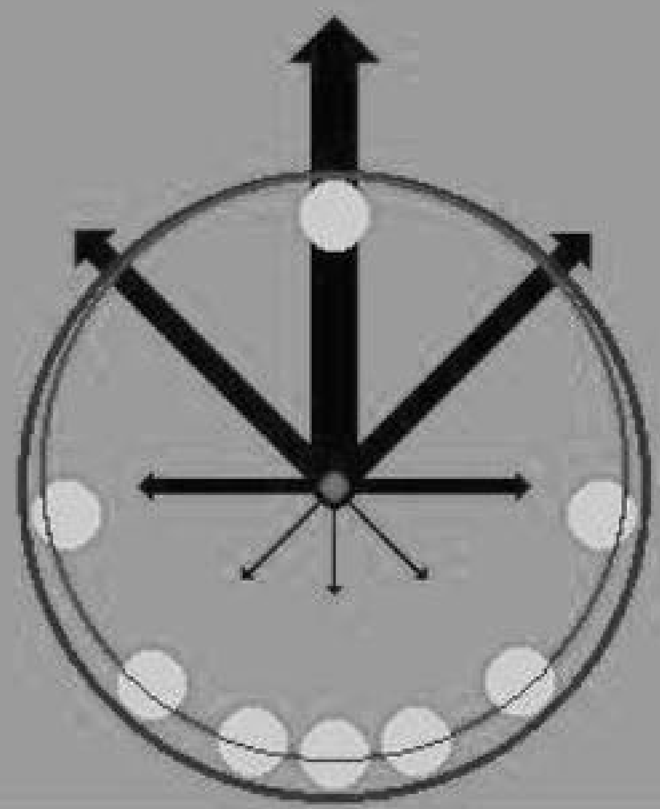

Figure 3A Centrifugal Force Profile, Accelerating GIT

orbitals place on the race. In figure 3B, the unequal rays coming down from the centre of the circle show the centrifugal force profile, which is very heavy to the front (the direction you're going toward—up, in this view!) and rather skinny on the backside.

In previous devices (the ones with the dumb weights that don't work so well), these two force-profiles exactly cancelled each other out over time, and *no thrust* was the result.

THE "GIT" IN OPERATION

Starting with *zero* thrust of a variable velocity type of inertial thruster, we look at what we have in that zero, and it's a tug of war that stays balanced (through time) over the mud pit. No one wins! So, how about tilting the odds in favour of one team, and taking a wide swathe out of the losing side's foothold? *We* can *do* that!

With orbitals that can increase and decrease their spin rate, we now have somewhere to put some of one side of the momentum tug-of-war. While the acceleration energy does in fact react with the race to slow it down (transferred into the race as a thrust wanting to hold you back), in my device the spin axis of the orbital shares some of that reverse thrust.

A good portion of that reverse vector is turned head over tail by the orbital as an increase in spin rate, thus removing some of the reverse force from the centre of mass of the total system.

The orbitals are included in the system mass (centroid), but the energy needed to accelerate (in a linear sense) a spinning orbital is darn near equal to that needed to push along a non-spinning one!

Our orbital can gulp up and regurgitate momentum and not get heavier against the race! A bulimic orbital! The race does not absorb the total energy of the decelerating orbital, so the now stronger centrifugal force profile can win our tug of war.

Upon reaching the tail of our race, the orbital now has two momentum components: its increased spin momentum, and its reduced forward momentum.

On its way back to the nose, the orbital powers itself against the race to accelerate it, relative to the race. However, since the decreasing spin is winding out to accelerate the orbital, now it only needs to accelerate one side. Since half of the mass is already travelling in the direction you want it to go, less energy of position, from the centre of mass of the system, is needed to motivate it forward in the race.

In one complete orbit, we have three inertial profiles to examine. The centrifugal force profile is easily found by the known race velocity squared, times its mass, divided by the radius. It will be constant regardless of orbital spin rate.

The centrifugal profile of, say, a 2:1 difference in nose and tail velocity is 4 times what it is at the tail. If the nose/tail velocity difference is 10, then the centrifugal force at the nose is 100 times.

There is less total difference than supposed by the last statement. Of the actual forces over time, the longer dwell-time of the orbital at the tail does cut down the dramatic gain of the centrifugal force; but still, it *is* an unbalanced centrifugal force. (Race velocity *squares* the radial force; time only adds linearly to the thrust at the reverse positions.)

The acceleration and deceleration of the orbital about the race is rather easy, too. This is the force that previously held you back, and one more component is factored in with it: the spin accelerations.

The energy has to come from somewhere (literally, a vectored thrust of magnitude), and both experience and theory have that spin thrust coming from the back-directed circumferential forces.

By having the orbital spin, we now have another dimension in which to store, for a convenient time (and direction), part of one side of the tug of war. Now the impossible is not only possible, it's been repeated many times around the world!

So here is the question. What are we trading for energy of position in space without an outside mass exchange? Is it time? Is it a dimensional 'folding' of space on one side and 'unfolding' (unwinding, actually) on the other side that makes it operate?

That's over *my* head! It works. Whaaat? You need to know *why*? Me, too, actually. I've kicked around many ideas, yet I have enough traditional science under my lid that it's difficult to think along 'heretical' lines, so I fully understand the difficulties that those well-schooled in the physical sciences have in looking into my (and others') claims. So *dis*prove it!

As long as the spin accelerations are accounted for (i.e., from what vector they enter and leave the orbital from the race), and an honest attempt is made, I'm confident that eyes will be opened—though opening of *minds* may take a little longer!

TOWARDS CHEAP SPACE FLIGHT?

Consider this my personal invite to you, to join a growing number of visionaries who want to see the *cheap space flight era* begin *as soon as possible*! Many have attempted the math, and those who "don't need to figure-in the spin, since we're only considering the interaction of the one mass on the frame" are disqualified by their own words. We need to account for the momentum wrapped around the orbital.

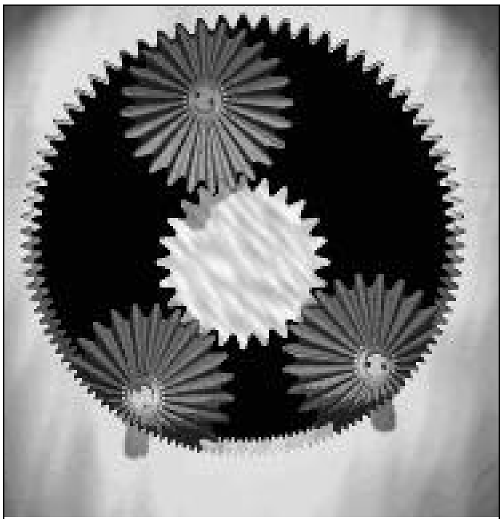

Figure 2

Those calculations that show unidirectional thrust only from a sum of the centrifugal and the circumferential (energy and vectors needed to slow down and speed up the orbitals) are *very* suspect, as those sums should be as close to zero as your error factor allows; and those sums that *only* consider the spin interactions, assuming an initial zero sum for centrifugal and circumferential, are a few bricks short of a proof.

I am aware of proofs that haven't reached me yet, and that there must be treatments that I'll likely never see from the research labs about the world; but the first person to do a good analysis that I recognise as sound (and, of course, that I check), will likely go into history as the first to do so, and likely get a lot of job offers shortly thereafter!

The challenge is still unanswered; no one has made the finals to date (5 January 1998, at the time of writing). Surely among the thousands who read my website there is one so bold as to prove that inertial propulsion by this means is real? Write to me; I'll be happy to assist with whatever further info I can give.

At this writing I am in the process of animating a 5:1 race with gears, to derive particulars for a standardised problem. Annotated graphics of the movement and spin particulars will be posted in the near future on my Internet website.

(Source: David Eugene Cowlishaw, PO Box 733, Silverton, Oregon 97381, USA; e-mail, davidc@open.org; website, www.open.org/davidc/gitplain.htm; posted 5 January 1998; concept released 4 May 1997 in public release document, git - works.htm)